WHAT IS CLAIMED IS:

1. A nonvolatile magnetic memory device having a nonvolatile magnetic memory array comprising;

(A) write-in word line(s) that is(are) M ($M \geq 1$) in number, extending in a first direction,

(B) bit lines that are N ($N \geq 2$) in number, extending in a second direction different from the first direction, and

(C) tunnel magnetoresistance devices, each being formed in an overlap region of the write-in word line and the bit line and having a stacking structure of a first ferromagnetic layer, a tunnel barrier and a second ferromagnetic layer, the first ferromagnetic layer being electrically insulated from the write-in word line, and the second ferromagnetic layer being electrically connected to the bit line,

wherein:

when data is written into the tunnel magnetoresistance device positioned in the overlap region of the m-th-place write-in word line (m is one of 1, 2, ... M) and the n-th-place bit line (n is one of 1, 2, ... N), a current $I(m)_{RWL}$ is passed through the m-th-place write-in word line and a current $g(0)\cdot I(n)_{BL}$ [g(0):coefficient] is passed through the n-th-place bit line, and at the same time, a current $g(k)\cdot I(n)_{BL}$ [g(k):coefficient] is passed through the q-th-place bit line ($q = n + k$, k is ± 1, ± 2, ..., and the total number of the lines is K),

a spatial FIR filter assuming magnetic fields, which are supposed to be formed in the n-th-place bit line and the bit lines that are K in number by the current $I(n)_{BL}$, to be discrete pulse response and assuming the coefficients g(0) and g(k) to be tap-gains is constituted of the n-th-place bit line and the bit lines that are K in number, and

the coefficients g(0) and g(k) are defined such

that data is written into the tunnel magnetoresistance device positioned in the overlap region of the m-th-place write-in word line and the n-th-place bit line and no data are written into the tunnel magnetoresistance devices positioned in the overlap regions of the m-th-place write-in word line and the bit lines that are K in number by means of a synthetic magnetic field based on a magnetic field generated by the current $g(0) \cdot I(n)_{BL}$ flowing in the n-th-place bit line, magnetic fields generated by the currents $g(k) \cdot I(n)_{BL}$ flowing in the bit lines that are K in number, and a magnetic field generated by the current $I(m)_{RWL}$ flowing in the m-th-place write-in word line.

2. The nonvolatile magnetic memory device according to claim 1, in which the coefficients g(0) and g(k) that are assumed to be tap-gains are defined so as to nearly satisfy the Nyquist's first criterion.

3. The nonvolatile magnetic memory device according to claim 1, in which the value of k covers values of 1 and 2.

4. The nonvolatile magnetic memory device according to claim 1, in which when the absolute value of the maximum value of the values that the k represents is k_0,

a group of first dummy line(s) that is(are) k_0 in number is provided outside the first bit line and in parallel with the first bit line,

a group of second dummy line(s) that is(are) k_0 in number is provided outside the N-th-place bit line and in parallel with the N-th-place bit line, and

the current $g(k) \cdot I(n)_{BL}$ is passed through a $[(1-n)+|k|]$-th-place first dummy line constituting the group of the first dummy line(s) or an $[n-N+|k|]$-th-place second dummy line constituting the group of the second

dummy line(s).

5. The nonvolatile magnetic memory device according to claim 4, in which the value of k covers values of 1 and 2, and the value of k_0 is 2.

6. A method of writing data into a tunnel magnetoresistance device in a nonvolatile magnetic memory device having a nonvolatile magnetic memory array comprising;

(A) write-in word line(s) that is(are) M ($M \geq 1$) in number, extending in a first direction,

(B) bit lines that are N ($N \geq 2$) in number, extending in a second direction different from the first direction, and

(C) tunnel magnetoresistance devices, each being formed in an overlap region of the write-in word line and the bit line and having a stacking structure of a first ferromagnetic layer, a tunnel barrier and a second ferromagnetic layer, the first ferromagnetic layer being electrically insulated from the write-in word line, and the second ferromagnetic layer being electrically connected to the bit line,

wherein:

when it is assumed that data is written into the tunnel magnetoresistance device positioned in the overlap region of the m-th-place write-in word line (m is one of 1, 2, ... M) and the n-th-place bit line (n is one of 1, 2, ... N), a current $I(m)_{RWL}$ is passed through the m-th-place write-in word line and a current $g(0) \cdot I(n)_{BL}$ [g(0):coefficient] is passed through the n-th-place bit line, and at the same time, a current $g(k) \cdot I(n)_{BL}$ [g(k):coefficient] is passed through the q-th-place bit line ($q = n + k$, k is ± 1, ± 2, ..., and the total number of the lines is K),

a spatial FIR filter assuming magnetic fields, which are supposed to be formed in the n-th-place bit

line and the bit lines that are K in number by the current $I(n)_{BL}$, to be discrete pulse response and assuming the coefficients g(0) and g(k) to be tap-gains is constituted of the n-th-place bit line and the bit lines that are K in number, and

the coefficients g(0) and g(k) are defined such that data is written into the tunnel magnetoresistance device positioned in the overlap region of the m-th-place write-in word line and the n-th-place bit line and no data are written into the tunnel magnetoresistance devices positioned in the overlap regions of the m-th-place write-in word line and the bit lines that are K in number by means of a synthetic magnetic field based on a magnetic field generated by the current $g(0) \cdot I(n)_{BL}$ flowing in the n-th-place bit line, magnetic fields generated by the currents $g(k) \cdot I(n)_{BL}$ flowing in the bit lines that are K in number, and a magnetic field generated by the current $I(m)_{RWL}$ flowing in the m-th-place write-in word line,

said method comprising letting the current $I(m)_{RWL}$ flow in the m-th-place write-in word line, and simultaneously letting the following currents $i(n)_{BL}$ flow in each of the first bit line to the N-th-place bit line,

$$\mathrm{i}\,(n)_{\mathrm{BL}} = \sum_{k=-k_0}^{k_0} g\,(k) \cdot I\,(n-k)_{BL} \qquad (1)$$

wherein k_0 is an absolute value of the maximum value that k represents, and k in the expression (1) includes 0.

7. The method of writing data into a tunnel magnetoresistance device in a nonvolatile magnetic memory device according to claim 6, in which the coefficients g(0) and g(k) that are assumed to be tap-gains are defined so as to nearly satisfy the Nyquist's

first criterion.

8. The method of writing data into a tunnel magnetoresistance device in a nonvolatile magnetic memory device according to claim 6, in which the value of k covers values of 1 and 2, and the value of k_0 is 2.

9. The method of writing data into a tunnel magnetoresistance device in a nonvolatile magnetic memory device according to claim 6, in which

a group of first dummy line(s) that is(are) k_0 in number is provided outside the first bit line and in parallel with the first bit line,

a group of second dummy line(s) that is(are) k_0 in number is provided outside the N-th-place bit line and in parallel with the N-th-place bit line, and

the current $g(k)\cdot I(n)_{BL}$ is passed through a $[(1-n)+|k|]$-th-place first dummy line constituting the group of the first dummy line(s) or an $[n-N+|k|]$-th-place second dummy line constituting the group of the second dummy line(s).

10. The method of writing data into a tunnel magnetoresistance device in a nonvolatile magnetic memory device according to claim 9, in which the value of k covers values of 1 and 2, and the value of k_0 is 2.

11. A nonvolatile magnetic memory device having a nonvolatile magnetic memory array comprising;

(A) write-in word lines that are M ($M\geq2$) in number, extending in a first direction,

(B) bit line(s) that is(are) N ($N\geq1$) in number, extending in a second direction different from the first direction,

(C) tunnel magnetoresistance devices, each being formed in an overlap region of the write-in word line and the bit line and having a stacking structure of

a first ferromagnetic layer, a tunnel barrier and a second ferromagnetic layer, the first ferromagnetic layer being electrically insulated from the write-in word line, and the second ferromagnetic layer being electrically connected to the bit line,

wherein:

when data is written into the tunnel magnetoresistance device positioned in the overlap region of the m-th-place write-in word line (m is one of 1, 2, ... M) and the n-th-place bit line (n is one of 1, 2, ... N), a current $I(n)_{BL}$ is passed through the n-th-place bit line and a current $g(0) \cdot I(m)_{RWL}$ [g(0):coefficient] is passed through the m-th-place write-in word line, and at the same time, a current $g(k) \cdot I(m)_{RWL}$ [g(k):coefficient] is passed through the p-th-place write-in word line ($p = n + k$, k is ± 1, ± 2, ..., and the total number of the lines is K),

a spatial FIR filter assuming magnetic fields, which are supposed to be formed in the m-th-place write-in word line and the write-in word lines that are K in number by the current $I(m)_{RWL}$, to be discrete pulse response and assuming the coefficients g(0) and g(k) to be tap-gains is constituted of the m-th-place write-in word line and the write-in word lines that are K in number, and

the coefficients g(0) and g(k) are defined such that data is written into the tunnel magnetoresistance device positioned in the overlap region of the m-th-place write-in word line and the n-th-place bit line and no data are written into the tunnel magnetoresistance devices positioned in the overlap regions of the n-th-place bit line and the write-in word lines that are K in number by means of a synthetic magnetic field based on a magnetic field generated by the current $g(0) \cdot I(m)_{RWL}$ flowing in the m-th-place write-in word line, magnetic fields generated by the currents $g(k) \cdot I(m)_{RWL}$ flowing in the write-in word lines that are K in number, and a

magnetic field generated by the current $I(n)_{BL}$ flowing in the n-th-place bit line.

12. The nonvolatile magnetic memory device according to claim 11, in which the coefficients g(0) and g(k) that are assumed to be tap-gains are defined so as to nearly satisfy the Nyquist's first criterion.

13. The nonvolatile magnetic memory device according to claim 11, in which the value of k covers values of 1 and 2, and the value of k_0 is 2.

14. The nonvolatile magnetic memory device according to claim 11, in which when the absolute value of the maximum value of the values that the k represents is k_0,

a group of first dummy line(s) that is(are) k_0 in number is provided outside the first write-in word line and in parallel with the first write-in word line,

a group of second dummy line(s) that is(are) k_0 in number is provided outside the M-th-place write-in word line and in parallel with the M-th-place write-in word line, and

the current $g(k)\cdot I(m)_{RWL}$ is passed through a $[(1-m)+|k|]$-th-place first dummy line constituting the group of the first dummy line(s) or an $[m-M+|k|]$-th-place second dummy line constituting the group of the second dummy line(s).

15. The nonvolatile magnetic memory device according to claim 14, in which the value of k covers values of 1 and 2, and the value of k_0 is 2.

16. A method of writing data into a tunnel magnetoresistance device in a nonvolatile magnetic memory device having a nonvolatile magnetic memory array comprising;

(A) write-in word lines that are M ($M \geq 2$) in number, extending in a first direction,

(B) bit line(s) that is(are) N ($N \geq 1$) in number, extending in a second direction different from the first direction,

(C) tunnel magnetoresistance devices, each being formed in an overlap region of the write-in word line and the bit line and having a stacking structure of a first ferromagnetic layer, a tunnel barrier and a second ferromagnetic layer, the first ferromagnetic layer being electrically insulated from the write-in word line, and the second ferromagnetic layer being electrically connected to the bit line,

wherein:

when it is assumed that data is written into the tunnel magnetoresistance device positioned in the overlap region of the m-th-place write-in word line (m is one of 1, 2, ... M) and the n-th-place bit line (n is one of 1, 2, ... N), a current $I(n)_{BL}$ is passed through the n-th-place bit line and a current $g(0) \cdot I(m)_{RWL}$ [g(0):coefficient] is passed through the m-th-place write-in word line, and at the same time, a current $g(k) \cdot I(m)_{RWL}$ [g(k):coefficient] is passed through the p-th-place write-in word line ($p = n + k$, k is ± 1, ± 2, ..., and the total number of the lines is K),

a spatial FIR filter assuming magnetic fields, which are supposed to be formed in the m-th-place write-in word line and the write-in word lines that are K in number by the current $I(m)_{RWL}$, to be discrete pulse response and assuming the coefficients g(0) and g(k) to be tap-gains is constituted of the m-th-place write-in word line and the write-in word lines that are K in number, and

the coefficients g(0) and g(k) are defined such that data is written into the tunnel magnetoresistance device positioned in the overlap region of the m-th-place write-in word line and the n-th-place bit line and

no data are written into the tunnel magnetoresistance devices positioned in the overlap regions of the n-th-place bit line and the write-in word lines that are K in number by means of a synthetic magnetic field based on a magnetic field generated by the current $g(0)\cdot I(m)_{RWL}$ flowing in the m-th-place write-in word line, magnetic fields generated by the currents $g(k)\cdot I(m)_{RWL}$ flowing in the write-in word lines that are K in number, and a magnetic field generated by the current $I(n)_{BL}$ flowing in the n-th-place bit line,

said method comprising letting the current $I(n)_{BL}$ flow in the n-th-place bit line, and simultaneously letting the following currents $i(m)_{RWL}$ flow in each of the first bit line to the M-th-place write-in word line,

$$i(m)_{RWL} = \sum_{k=-k_0}^{k_0} g(k)\cdot I(m-k)_{RWL} \qquad (2)$$

wherein k_0 is an absolute value of the maximum value that k represents, and k in the expression (2) includes 0.

17. The method of writing data into a tunnel magnetoresistance device in a nonvolatile magnetic memory device according to claim 16, in which the coefficients g(0) and g(k) that are assumed to be tap-gains are defined so as to nearly satisfy the Nyquist's first criterion.

18. The method of writing data into a tunnel magnetoresistance device in a nonvolatile magnetic memory device according to claim 16, in which the value of k covers values of 1 and 2, and the value of k_0 is 2.

19. The method of writing data into a tunnel magnetoresistance device in a nonvolatile magnetic

memory device according to claim 16, in which when the absolute value of maximum value of values that the k represents is k_0,

a group of first dummy line(s) that is(are) k_0 in number is provided outside the first write-in word line and in parallel with the first write-in word line,

a group of second dummy line(s) that is(are) k_0 in number is provided outside the M-th-place write-in word line and in parallel with the M-th-place write-in word line, and

the current $g(k)\cdot I(m)_{RWL}$ is passed through a $[(1-m)+|k|]$-th-place first dummy line constituting the group of the first dummy line(s) or an $[m-M+|k|]$-th-place second dummy line constituting the group of the second dummy line(s).

20. The method of writing data into a tunnel magnetoresistance device in a nonvolatile magnetic memory device according to claim 19, in which the value of k covers values of 1 and 2, and the value of k_0 is 2.

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